REMARKS/ARGUMENT

Claims 118-189 are pending in the present application. Claims 1-117 were cancelled in a previous amendment. Claims 118 and 150 are amended herein. Claims 182-189 are new.

Independent claim 118 is amended to recite, *inter alia*, a method executed in a computer system for producing a model of a combined physical system comprising: (i) representing each of a plurality of systems as an application mode modeling <u>in up to three space dimensions</u> the physical quantities of said each system, wherein the application modes are configured to model the physical quantities of at least one of a <u>structural system</u>, a <u>fluids system</u>, and an <u>electromagnetic system</u>; (ii) determining, <u>using a processor</u>, a representation of a partial differential equation for each application mode; (iii) determining, using the processor or another processor, a solution to <u>the model</u> of the combined physical system, and (iv) <u>storing</u> in <u>a memory</u> or <u>a data storage system</u> the solution to the model of the combined physical system.

Independent claim 150 is amended to recite, *inter alia*, a computer readable medium having computer executable instructions stored thereon which when executed by at least one processor cause the processor to accomplish steps comprising: (i) representing each of a plurality of systems as an application mode modeling in <u>up to three space dimensions</u> the physical quantities of said each system; and (ii) outputting a model by forming a combined system of partial differential equations using partial differential equation systems associated with said plurality of systems, wherein the <u>output of the model</u> is configured for <u>display on a graphical user interface</u>. Independent claim 150 was further amended to correct a grammatical informality.

New claims 182 and 183 depend from independent claims 118 and 150, respectively, and further recite, *inter alia*, modeling the physical quantities of the systems in a time dimension.

New claim 184 recites, *inter alia*, a method executed in a computer apparatus for creating a model of a combined physical system comprising: (i) representing at least one of a plurality of systems, <u>having up to three space dimensions</u>, as two or more selected application modes modeling the physical quantities of said one of said plurality of systems; (ii) determining a

solution to <u>the model</u> of the combined physical system, and (iii) <u>storing in a memory or a data storage device</u> the solution to the model.

New claim 185 depends from independent claim 184 and recites, *inter alia*, modeling the physical quantities of the at least one of the plurality of systems in a time dimension.

New claim 186 recites, *inter alia*, a computer readable medium having stored thereon instructions for creating a model of a combined physical system which when executed by at least one processor, causes the processor to perform steps comprising: (i) representing at least one of a plurality of systems as two or more selected application modes modeling physical quantities of said one of said plurality of systems, wherein the application modes are configured to model physical quantities of at least one of a <u>structural system</u>, a <u>fluids system</u>, and an <u>electromagnetic system</u>; (ii) determining a solution to <u>the model</u> of the combined physical system, and (iii) outputting the solution to the model in a format configurable for display on a graphical user interface.

New claim 187 recites, *inter alia*, a method executed in a computer system for creating a model of a combined physical system comprising: (i) defining a plurality of user-defined application modes modeling physical quantities of an associated model <u>having up to three space dimensions</u>, wherein the application modes are configured to model the physical quantities of at least one of a <u>structural system</u>, a <u>fluids system</u>, and an <u>electromagnetic system</u>; (ii) determining, <u>using a processor</u>, sets of partial differential equations; (iii) determining, using the processor or another processor, a solution to the model, (iv) <u>storing</u> in a <u>computer readable memory</u> or a <u>computer readable data storage system</u> the solution to the model; and (v) outputting the solution to the model in a format configurable for <u>display on a graphical user interface</u>.

New claim 188 depends from independent claim 187 and recites, *inter alia*, the application modes are further configured to model the physical quantities in a time dimension.

New claim 189 recites, *inter alia*, a computer readable medium having stored thereon instructions for creating a model of a combined physical system which when executed by at least one processor, causes the processor to perform steps comprising: (i) defining a plurality of user-defined application modes modeling physical quantities of an associated model, wherein the

application modes are configured to model the physical quantities of at least one of a <u>structural</u> <u>system</u>, a <u>fluids system</u>, and an <u>electromagnetic system</u>; and (ii) determining a solution to <u>the</u> <u>model</u>.

Support for the claim amendments and new claims can be found, for example, in FIGs. 1-3, 25, 26, 30, 57, 58, 67 and 69 and in ¶¶ [0086], [0089], [0090], [0102], [0107], [0124], [0233], [0382], [0504] and [0507] of the present application as published in US2004/000034514. No new matter has been added.

Additional discussion of the currently pending claims are provided below. Reconsideration and allowance are respectfully requested in view of the following remarks.

Patentable Subject Matter Rejection
Claims 118-181

In the October 19, 2007 final Office action, claims 118-181 were rejected under 35 U.S.C. § 101 on allegations of the claims preempting every substantial application of a mathematical algorithm. *See* Office Action, at ¶¶ 6, 12. Claims 119-149 depend from rejected independent claim 118. Claims 151-181 depend from rejected independent claim 150. The rejection of claims 118-181 are respectfully traversed.

Although the claimed invention utilizes mathematical algorithms, the invention does so in a way to achieve a useful and tangible result in a manner that does not preempt every substantial application of the mathematical algorithms. The invention relates to creating or producing a model of a combined physical system. The invention allows partial differential equations, representing physical properties of a system, to be solved to predict behavior of the combined physical system.

Solving partial differential equations pertaining to related physical properties is a vital aspect of sophisticated product design in some industries. For example, in an electric motor design, determining the temperature of and electric current density through the core of the motor, as a function of position in one or more dimensions, is a very important step toward ensuring that the electric motor design can meet its performance goals without overheating.

The Office Action relies upon *Gottschalk v. Benson*, 409 U.S. 63 (1972), as support for the allegation that the rejected claims preempt <u>every</u> substantial application for a mathematical algorithm. However, the pending claims are distinguishable from *Benson*. Unlike the claims in *Benson*, the amended claims, as discussed above, extend beyond the attempt in *Benson* to patent a binary code that has no practical application outside a computer. For example, claim 118 includes (i) a method executed in a computer system for producing a model, (ii) determining, using the processor or another processor, a solution to <u>the model</u> of the combined physical system, and (iv) <u>storing</u> in <u>a memory</u> or <u>a data storage system</u> the solution to the model of the combined physical system. Claim 150 includes outputting a model by forming a combined system of partial differential equations, wherein the output of the model is configured to be stored in a computer readable memory or in a computer data storage system. Thus, the claims lead to a tangible result that, as explained above, is useful in product design in some industries.

The specification identifies a number of useful applications of the claimed invention, but the claims do not preempt <u>every</u> substantial practical application. For example, the claims do not preempt applications, such as, certain quantum-field theory application, e.g., annihilation of elementary particles in high-energy physics, or string interactions in superstring theory. Claims 118 and 150 recite, *inter alia*, <u>modeling in up to three space dimensions</u>. In addition, certain embodiments described in the specification provide examples of selected portions of the claimed methods that can be performed by <u>hand calculation</u>. In contrast, the pending claimed recite "a method executed on a computer system" or "a computer readable medium having executable instructions stored thereon", and thus, recite a computer-based application, not an application based on hand calculations. Furthermore, claim 118 recites application modes configured to model physical quantities of at least one of a structural system, a fluids system, and an electromagnetic system.

For at least these reasons, claims 118-181 do <u>not</u> preempt <u>every</u> substantial practical application of a mathematical algorithm, and thus, are in a condition for allowance.

New Claims 182-189

New claims 182-183 depend from claims 118 and 150, respectively, and further include modeling the physical quantities of the systems in a time dimension. For at least the reasons discussed for claims 118 and 150, new claims 182-183 are in a condition for allowance.

New claims 184, 186, 187, and 189 recite, *inter alia*, (i) a method executed on a computer apparatus for creating a model of a combined physical system, (ii) a method executed in a computer system for creating a model of a combined physical system, or (iii) a computer readable medium having stored thereon instructions for creating a model of a combined physical system. That is, similar to claims 118 and 150, new claims 184, 186, 187, and 189 recite a computer-based application that does not preempt applications of an algorithm using hand calculations. In addition, selected new claims recite (a) storing in a computer readable memory or in a computer readable data storage system the solution to the model – claims 184 and 187, or (b) outputting said solution to said model in a format configurable for display on a graphical user interface – claims 186 and 187. Furthermore, selected new claims recite application modes configured to model physical quantities of at least one of a structural system, a fluids system, and an electromagnetic system – claims 186, 187, and 189.

New claims 185 and 188 depend from claims 184 and 187 to include modeling physical quantities in a time dimension.

For at least these reasons, new claims 182-189 are in a condition for allowance.

CONCLUSION

The Applicant submits that claims 118-189 are in condition for allowance and action toward that is respectfully requested. If there are any matters which may be resolved or clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney at (312) 425-8552.

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It is believed that no additional fees are due other than the fee for the three-month extension of time and the RCE fee; however, should any additional fees be required (except for payment of the issue fee), the Commissioner is authorized to deduct the fees from the Nixon Peabody Deposit Account No. 50-4181, Order No. 801939-000112.

                                        Respectfully submitted,

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